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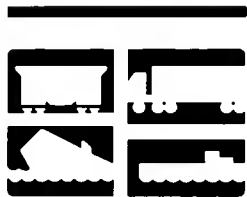
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Sorghum Movements in the United States

Interregional Flow Patterns and Transportation Requirements in 1985

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This bulletin is one in a series of North Central and Southern Cooperative bulletins. It represents a contribution to North Central Project NC-137, "Effect of Changes in Transportation on Performance of the U.S. Agricultural Transportation System," and to Southern Regional Project S-176, "Interregional Marketing Systems for Grains and Soybeans." The Illinois Agricultural Experiment Station is the publishing station. Requests for copies of this bulletin may be sent to Office of Agricultural Communications and Education, 67 Mumford Hall, 1301 West Gregory Drive, University of Illinois, Urbana, Illinois 61801.

Abstract

Information about the origin, destination, and mode of transport in marketing grain is often useful in making policy and investment decisions related to grain. The data and analyses presented in this publication were developed to aid in making these policy and investment decisions. This bulletin contains the results of a nationwide study to obtain the volumes of grain sorghum moved by truck, rail, and water among destinations in 42 states during 1985. The study was designed to update a similar survey conducted in 1977. This bulletin contains a description of the findings of the 1985 survey and an analysis of the changes that have occurred between the 1977 survey and 1985.

Preface

This bulletin contains the results of nationwide research to obtain the volumes of sorghum moved between U.S. origins and destinations using various transport modes in 1985. Other publications in this series provide similar information for corn, soybeans, wheat, and oats. It updates a similar survey conducted in 1977.

During 1986, members of two university research committees located in 21 states conducted surveys to gather data about the origin and destination of wheat, corn, soybeans, sorghum, and oats in each of their states. In another 12 states, private consultants or university faculty at land grant institutions in the states administered the survey under contracts. Finally, data about grain and soybean movement in an additional nine states were gathered using a combination of secondary data, neighboring state surveys, and interviews with managers of major firms and state agricultural officials. The resulting database contained information from 42 states for the year 1985.

The industry surveys were coordinated in the Department of Agricultural Economics at the University of Illinois at Champaign-Urbana. The data were summarized, verified, and reconciled under the supervision of Joseph E. Vercimak, University of Illinois, and Dr. Dean Baldwin, Ohio State University. The success of this research project is due to the cooperation of thousands of grain marketing firms and the efforts of researchers around the United States.

The research was partially funded by the Federal Railroad Administration under contract No. DTFR 53-84-C-00036, the Agricultural Marketing Service, USDA; the Agricultural Cooperative Service, USDA; the Illinois Department of Agriculture and the Soo Line Railroad. Administration of the grant funds was coordinated by Joseph E. Vercimak. The research is a contribution to regional research projects S-176, "Effect of Changes in Marketing Systems for Grains and Soybeans" and NC-137, "Effect of Changes in Transportation on Performance of the U.S. Agricultural Transportation System."

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Sorghum Movements in the United States

Interregional Flow Patterns and Transportation Requirements in 1985

Purpose of the Study

Introduction

Information about the origins, destinations, and modes of transport in marketing grain is often useful in making policy and investment decisions related to grain. Information about changes in origins, destinations, and modes of transport over time can provide guidelines for decisions made by producers and marketing firms. Understanding the relationships among origin of the grains, export volume, and mode of transport is essential to formulating pricing strategies, transportation policies, port investments, and expansion or contraction plans in the transport industries. Changes in export volume and state of origin cause firms in grain deficit states to alter their purchasing, transport, and storage decisions. The data and analysis presented in this publication will aid in making these policy and investment decisions.

This study of grain sorghum provides information about the volumes of grain moved between several states and port areas by truck, rail, and water during 1985. A similar study covering 1977 provides a benchmark against which to compare changes over time. Published data on production and export volumes provided a basis for some explanations of changes included in this bulletin. Changes in transportation rates and rate structures have altered the pattern of shipments and receipts.

Objectives of the Study

The general objectives of this study were to:

- (1) Identify the quantity of grain sorghum shipped between various state, regional, and export locations.
- (2) Determine the extent to which various transportation modes were employed in the movement of grain sorghum in the United States.
- (3) Compare the 1977 and 1985 patterns of shipments and modes of transport.

Methodology

Grain flow data were collected for the 1985 calendar year primarily through personal interviews with representatives of grain handling, storage, and processing firms. These firms included country elevators, subterminal elevators, terminal elevators, feed manufacturers, export elevators, commercial feedlots, poultry operations, processors, and millers. Representatives in each of the states surveyed were responsible for drawing a statewide sample and conducting the interviews. All 33 major producing and consuming states were included in the survey. This was accomplished by using members of two regional grain marketing and transportation committees at land-grant institutions in the states and by contracting with individuals in those grain producing states that were not represented on the regional committees. An additional nine states considered to be significant grain producers were added using secondary data and selected interviews.

In addition, information was obtained from the Interstate Commerce Commission about volumes shipped by rail and the U.S. Army Corps of Engineers (COE) about volumes shipped by barge.

Sampling Method

In those categories where the firms were few in number (such as processors), all of the firms were included in the survey. In those categories where the number of firms was too large for complete enumeration with available resources, the researchers used a stratified sampling technique. The stratified sample data were then expanded using multipliers to yield estimates of totals for each state.

For example, the stratified technique was used with inland grain elevators. The sampling of these elevators in each state was carried out by listing elevators in descending order of storage capacity. Then, starting with those having the largest capacity, firms with

successively smaller capacities were added to the sample until the total storage capacity of firms in the sample equalled 25 percent of the elevator storage in the state. A random sample of the remaining firms was then obtained, with not less than 10 percent of all firms in each category included. Additional stratification was used in states with large numbers of firms.

Some states derived samples using plants rather than firms. The research methodology allowed sampling by plant or firm provided that elevator capacity was adequately represented in the sample and the samples could be expanded to represent total grain transported. Some states used a complete enumeration of all firms.

River elevators were sampled at a rate of not less than 50 percent. Feed firms were surveyed from the largest downward until 10 percent of the total capacity was surveyed. A random sample was taken from the remaining firms. Integrated firms such as feedlots and poultry operations were sampled at the rate of not less than 50 percent. For processing firms, the sampling rate was usually 100 percent since the number of firms in each state was relatively small.

The data provided for 1985 were less complete than those provided for 1977 because some major processors and grain handlers refused to provide volume data by origin and destination. They gave a variety reasons for not providing the data.

To compensate for the lack of usable data from small firms, volume statistics from a firm of similar size and geographic location selected at random were included when available. For larger elevators or processors who did not supply data, volumes and flows were estimated from secondary sources or from the interviewers' prior knowledge of the firms. The estimates were then validated by the grain marketing specialist in each state based on his/her knowledge of grain movements and price relationships in the state.

Procedure

Each of the grain handlers and processors interviewed provided the same type of information: the volume, origin, and mode of transport for all grain received at and shipped from their facilities. Data were coded using a consistent format and sent to the University of Illinois for processing. Processing involved verifying the data and summarizing state totals that would be used in reconciling flows. The data were then sent to Ohio State University where the estimates of quantities transported between each origin and destination as reported by the shipping states were reconciled with the estimates reported by the receiving states. Responsibility for integrating these data and generating the data tables for the five commodities was distributed among four universities: corn at the University of Minnesota, soybeans and oats at Ohio State University, wheat at the University of Kentucky, and sorghum at the University of Illinois at Urbana-Champaign.

Transport information was also obtained from the Interstate Commerce Commission about rail shipments (the Waybill sample), and from the U.S. Army Corps of Engineers about barge shipments (the COE sample).

After the survey data were compiled and tabulated, representatives from the major receiving and shipping states met to reconcile differences among the three sources of volume information: (1) the survey data from the receiving states, (2) the survey data from the shipping states, and (3) secondary data including the Waybill sample from the Interstate Commerce Commission and the complete enumeration of all barge movements recorded on the data tapes by the U.S. Army Corps of Engineers (COE).

The low sampling rate for some types of shipments included in the Waybill sample gives rise to potential errors when the data are summarized on a state or sub-state basis. Records of total volume of barge shipments

and receipts in the COE data tapes were quite accurate but the tapes did not always identify ultimate origins and destinations when barges were transhipped or destinations were changed in transit.

Truck data were available only from the survey. Shipments from farms to elevators were identified only through records of elevator receipts. Truck shipments across state lines were especially difficult to verify since neither truckers nor farmers were included in the survey.

A final verification process was then undertaken using secondary data about movements into or out of each state, and the estimate of "exportable surplus" for each state. A grain marketing specialist from each state university in the regional committee calculated the surplus or deficit in his/her state in the following way: the estimate of the total amount of grain consumed by livestock, used for seed, and used in processing during calendar year 1985 was subtracted from the estimate of the amount of grain produced during 1985. The remainder was then adjusted by the amount of increase or decrease in inventory during the year. The resulting figure was accepted as an estimate of the surplus available for export or the deficit to be filled by imports from other states. Because much of this information, especially consumption by livestock, was based on estimates, the numbers were not expected to match reconciled flows exactly. However, these data provided additional information from which to judge the reasonableness of receipt and shipment data from the various sources. Sorghum used for feed is especially difficult to estimate since it is readily substituted for corn in many rations in response to small changes in relative prices. Estimates of production-utilization by state show geographical and year-to-year variation (Wailles and Vercimak, 1989).

These comparisons among the various data sources increased the confidence in the accuracy of estimates based on the less-than-com-

plete samples obtained from the population of all grain-handling firms.

Finally, the logic and consistency of each flow summary contained in these reports was checked by the representative who organized and conducted the survey in each state.

Production and Utilization

Production of sorghum reached 1.1 billion bushels in crop year 1985/86, exceeding production at the time of the 1977 survey by almost 340 million bushels (Table 1). Sorghum is grown for a variety of uses in the U.S., but about 55 percent to 70 percent of all sorghum produced is used for livestock in the form of fodder, pasture, or grain. The quantity used for feed varies greatly from year-to-year in response to changes in the relative price and the supply of sorghum compared to other feed grains. It is a common substitute for corn in livestock rations in many states. In 1985/86, the quantity of sorghum used for feed reached 663.8 million bushels, a major increase from the 447.5 million bushels in 1977/78. The quantity exported in 1985/86 had declined to 178 million bushels from a high of 329.6 million bushels in 1979/80.

The amount of sorghum used in industry and as food is a small percentage of the sorghum used, but has shown a rapid increase, especially during the period 1982/83 through 1985/86. The quantity used for seed has remained fairly stable at around 2 million bushels. During the two years since the 1985 survey of grain handlers was conducted, overall production, utilization and exports of sorghum have declined (Table 1).

The rapid increase in production between 1977/78 and 1985/86 has been accompanied by a relatively small increase in the amount of sorghum fed to livestock. The gap between production and consumption has widened by over 123 million bushels.

When combined with the decline in exports, this increase in production has increased

sorghum stocks from 117.3 million bushels in 1977/78 to 300.2 million in 1985/86, with a continued growth through 1987/88 to an estimated 743.3 million bushels (Figure 1).

Sorghum production is concentrated in a relatively small geographical region (Figure 2). Texas, Kansas, Nebraska, and Missouri have consistently accounted for nearly three-fourths of U.S. production (Table 2). Although production has increased in these states, their share of total production in the United States has declined over time for every state except Missouri. The four-state share decreased from 87 percent in 1977 to 72 percent

in 1985. Production increased in states along the Mississippi River Valley (including Missouri) and in the Southeast, reducing the share of most of the traditional sorghum-producing states, Texas, Kansas, and Nebraska (Table 2).

Changes in production regions and market demands have resulted in shifts in the destinations of sorghum shipments in domestic markets, accompanied by a reduction in the share moving to U.S. ports. The pattern of these changes in receipts and shipments provides insights into transportation requirements between surplus and deficit regions.

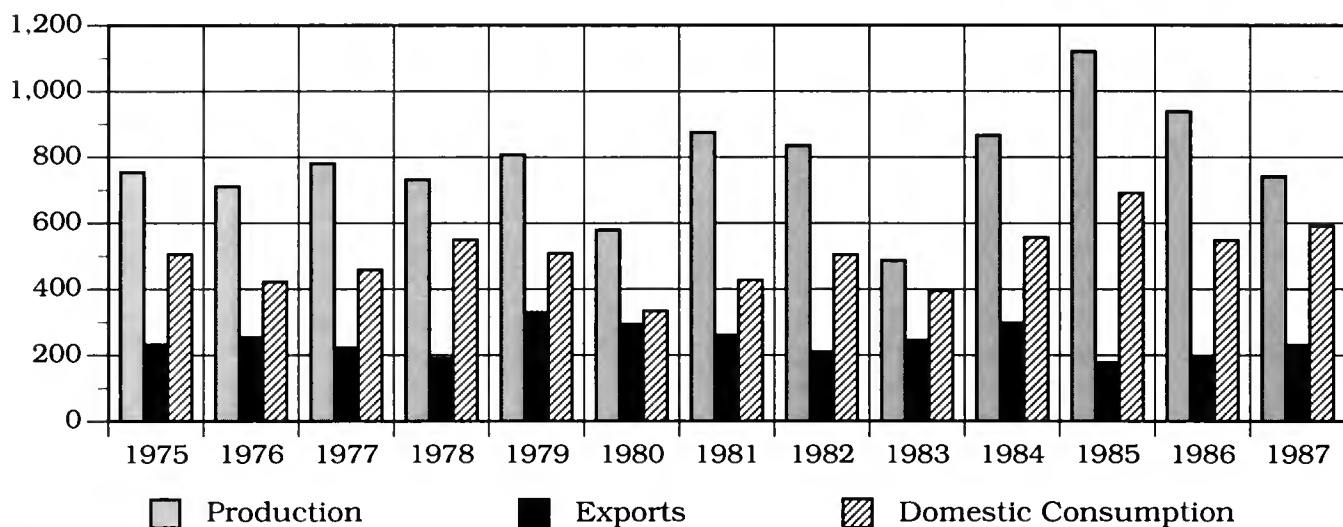
Table 1.
Grain Sorghum Supply and Distribution in the United States for Marketing Years from 1975/76 to 1987/88 (September/August marketing year).

Marketing Year	Supply			Disappearance				
	Beginning Stocks	Production	Total Supply	Food, Alc., & Industrial	Seed	Feed & Resid.	Exports	Total
<i>millions of bushels</i>								
1975/76	65.2	754.4	819.7	8.8	2.3	494.1	232.2	737.4
1976/77	82.3	710.8	793.1	8.6	2.0	411.2	254.0	675.8
1977/78	117.3	780.9	898.2	9.4	2.0	447.5	222.9	681.8
1978/79	216.4	731.3	947.7	10.0	1.8	537.9	190.1	739.8
1979/80	207.9	807.4	1,015.3	10.4	2.0	495.4	329.6	837.4
1980/81	177.9	579.3	757.2	9.1	2.0	322.7	293.1	626.9
1981/82	130.3	875.8	1,006.1	8.8	2.0	417.0	259.7	687.8
1982/83	318.6	835.1	1,153.7	7.9	1.8	494.8	210.1	714.6
1983/84	439.1	487.5	926.7	7.7	2.3	384.7	244.6	639.3
1984/85	287.1	866.2	1,153.7	15.3	2.0	539.3	296.9	853.5
1985/86	300.2	1,120.3	1,420.5	26.0	1.7	663.8	178.0	869.5
1986/87	551.0	938.1	1,489.1	13.0	1.6	532.9	198.3	745.8
1987/88	743.3	740.9	1,484.2	12.6	1.4	576.1	231.4	821.5

Source: Feed, Situation and Outlook, Economic Research Service, U.S.D.A., (various issues)

Figure 1.
United States Grain Sorghum Production, Domestic Consumption, and Exports, 1975/76 - 1987/88
 (September/August marketing year).

Thousands of bushels



Source: *Feed, Situation and Outlook*, ERS, USDA.

Figure 2.
United States Grain Sorghum Production, 1985.

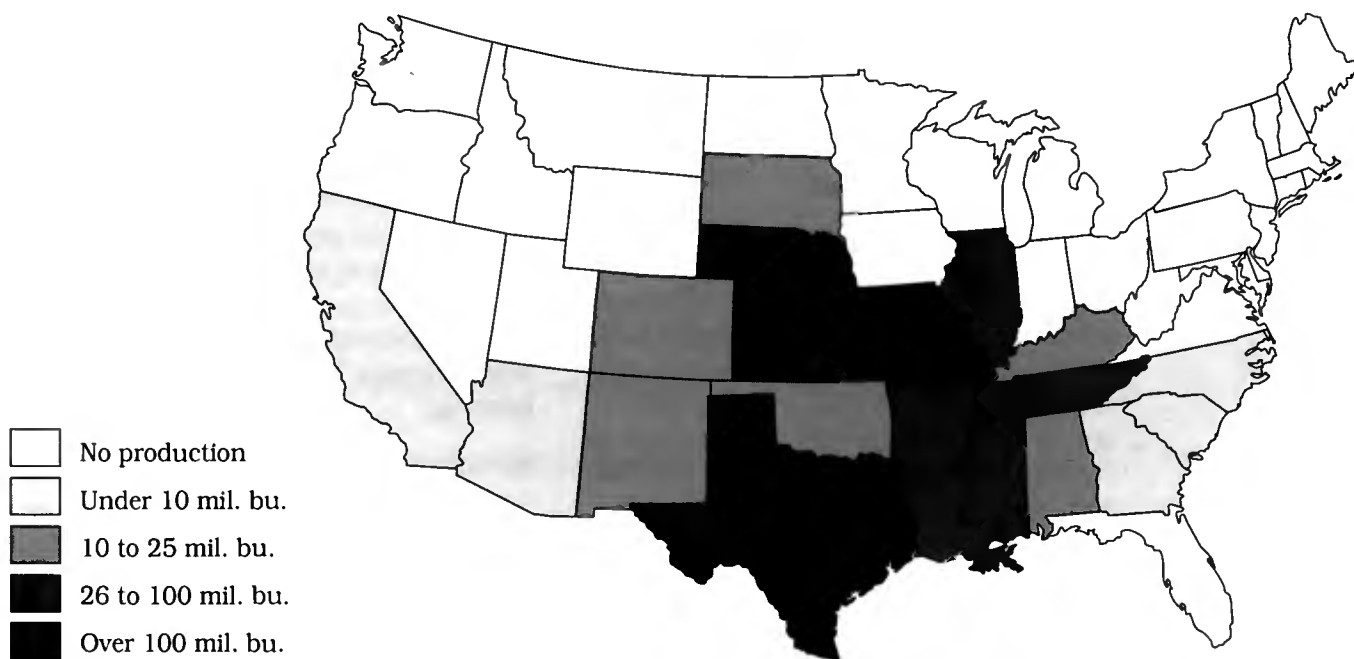


Table 2.

Production and Production Shares of Grain Sorghum by State, 1977 vs. 1985.

	1977		1985		Percent Change
	Production	Percent Share	Production	Percent Share	
	(,000 bu.)		(,000 bu.)		
Alabama	729	0.09	12,650	1.13	1635.25
Arizona	7,200	0.91	1,296	0.12	-82.00
Arkansas	13,104	1.65	66,240	5.91	405.49
California	9,636	1.22	2,988	0.27	-68.99
Colorado	8,153	1.03	11,200	1.00	37.37
Georgia	672	0.08	6,624	0.59	885.71
Illinois	4,096	0.52	36,190	3.23	783.54
Indiana	1,170	0.15	0		
Iowa	2,368	0.30	0		
Kansas	243,000	30.64	296,700	26.48	22.10
Kentucky	1,824	0.23	11,440	1.02	527.19
Louisiana	660	0.08	27,880	2.49	4124.24
Mississippi	768	0.10	39,680	3.54	5066.67
Missouri	67,890	8.56	117,030	10.45	72.38
Nebraska	146,970	18.53	154,400	13.78	5.06
New Mexico	11,760	1.48	13,920	1.24	18.37
North Carolina	2,664	0.34	3,224	0.29	21.02
Oklahoma	21,470	2.71	22,500	2.01	4.80
South Carolina	192	0.02	2,209	0.20	1050.52
South Dakota	16,807	2.12	15,000	1.34	-10.75
Tennessee	1,020	0.13	37,200	3.32	3547.06
Texas	230,400	29.05	241,900	21.59	4.99
Virginia	430	0.05	0		
Total	792,983	100.00	1,120,271	100.00	41.27

Source: *Feed, Situation and Outlook*, Economic Research Service, U.S.D.A., (various issues)

Analysis of Shipments and Receipts

Intrastate Movements

Intrastate movements of sorghum are shipments from one grain-handling firm to another within the same state. Country elevator receipts from farmers have not been included due to lack of complete data for several states. Also, some sorghum is fed on farms where grown and does not pass through commercial facilities from which data would be available. This is especially true for Colorado, Georgia, Kansas, Louisiana, Kentucky, New Mexico, North Carolina, Nebraska, and Missouri. Kansas and Texas, the two states with the largest volume of production, show large in-

trastate rail as well as truck movements (Table 3). Water movements are relatively small and limited primarily to Louisiana, Arkansas, Texas, Illinois, Mississippi, and Alabama, where the waterway system makes barge transport within the state feasible. Even then, these reported intrastate movements may be enroute to export with only an intermediate stop within the state. Short distance shipment by barge is generally not economical.

Interstate Receipts

Receipts of sorghum from other states reflect movements toward export points or into feed deficit regions. The largest volume of receipts is found in Arizona, Arkansas, California, Missouri, Oklahoma, and Texas.

Table 3.

1985 Intrastate Movements of Grain Sorghum for Each State by Mode of Transport.^a

State	Mode			Total	Production
	Truck ^b	Rail	Barge		
<i>thousands of bushels</i>					
Alabama	6,022	1,093	533	7,648	12,650
Arizona	1,725	2,190	0	3,915	1,296
Arkansas	47,329	0	212	47,541	66,240
California	914	0	0	914	2,988
Colorado	^b	248	0	631	11,200
Florida	^b	0	0	255	^c
Georgia	564	673	0	1,237	6,624
Illinois	7,584	5,295	1,726	14,605	36,190
Indiana	^b	286	0	290	^c
Kansas	46,122	67,113	0	113,235	296,700
Kentucky	362	0	0	362	11,440
Louisiana	2,165	1,272	118	3,555	27,880
Mississippi	11,647	990	52	12,689	39,680
Missouri	2,248	6,450	0	8,698	117,030
Nebraska	62,843	13,473	0	76,316	154,400
New Mexico	925	0	0	925	13,920
North Carolina	39	452	0	491	3,224
Oklahoma	^b	245	0	245	22,500
South Carolina	^b	0	0	0	2,209
South Dakota	^b	0	0	0	15,000
Tennessee	3,506	790	0	4,296	37,200
Texas	286,602	55,604	271	342,477	241,900
Utah	36	0	0	36	^c
Washington	0	248	0	248	^c
Total volume	481,275	156,422	2,912	640,609	1,120,271
Percent of total	75.13	24.42	0.45	100.00	

^a Shipments to port within a state are not included in intrastate totals.

^b Several states did not provide complete information on intrastate shipments so this column may understate total volume.

^c Production in these states was very small and was not reported in U.S.D.A. statistics.

Texas ranked second in grain sorghum production, but also ranked first in volume of grain sorghum received, as a result of its consumption of grain sorghum for feed, processing, and exports.

Transportation of interstate receipts was primarily by rail. A total of 47.71 percent were transported by rail, 32.55 percent by truck, and 29.75 percent by barge (Table 4). Receipts at export ports (shown in the lower portion of Table 4) indicate that much of the sorghum moving by barge was destined for the Gulf ports.

Interstate Shipments

Interstate shipments must match interstate receipts in total. Whatever is shipped from one location must be received at another. Slight discrepancies in survey data occurred as a result of direct exports that were counted as shipments in the state surveyed but were not identified as receipts. Also, some of the states not included in the survey may have received or shipped small quantities. Any discrepancies between total receipts and shipments were eliminated during reconciliation.

The states shipping the largest volumes were Kansas, Texas, Nebraska, and Missouri, all of which are large surplus producing states, moving their grain into deficit or exporting regions (Table 5). The destinations of shipments by state are presented in the Appendix of this report.

Receipts by Port Area

Ports in the United States were combined into port areas and port regions to simplify the analysis and comparisons (Table 7). The geographic concentration of production in the southwest states virtually eliminates the Great Lakes and Atlantic Coast as export ports for sorghum. Most exports of grain sorghum moved through the Gulf region, with the Louisiana Gulf receiving 48.59 percent (Table 8). The Texas Gulf ports accounted for another 32.67 percent and the Pacific region,

11.61 percent, with negligible amounts moving through the Eastern Gulf. The remaining 6.93 percent moved from interior points directly to foreign destinations.

Shipments to Port Regions

The majority of shipments to export areas are moved by barge, with 46.72 percent of total shipments by barge, 16.92 percent by truck, and 36.36 percent by rail (Tables 8 and 9). Texas and Missouri together accounted for over 46 percent of the total shipments to export locations. In the case of Texas, half of this total was moved by truck (Table 10). Shipments from Missouri, Kentucky, and Tennessee to the Gulf were almost entirely by barge. Arkansas, a major receiver of sorghum by truck and rail, was also a major source of exports moving by barge to the Gulf. Missouri received over 22 million bushels of sorghum from other states by truck and rail (Table 4) and shipped nearly 42 million to Gulf ports by barge (Table 10).

Kansas, Missouri, Texas, Nebraska and Arkansas generated 75.1 percent of total shipments to port areas. Texas accounted for 30 percent, Missouri 16.7 percent, and Kansas 10.7 percent (Table 10). The concentration of shipments to ports is the result of production concentration and access to ports (Figure 3).

Exports of grain sorghum from U.S. ports (primarily Gulf ports) were distributed among many countries throughout the world (Table 11). The largest recipient was Japan, followed closely by Mexico and Venezuela. These three countries together received 75 percent of all sorghum exported from the United States in 1985. The West Coast port areas are advantageous primarily for shipments to Japan because of the rate advantage and favorable rail rates from western producing areas to the West Coast. However, Gulf ports still originated 74.4 percent of the sorghum exported to Japan. Increased sorghum production across the Mississippi River Valley helped shift the export share to the Gulf region.

Table 4.
1985 Interstate Receipts of Grain Sorghum for Each State by Mode of Transport.^a

Destination State	Mode			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	4,991	6,672	2,673	14,336
Arizona	793	23,022	0	23,815
Arkansas	7,472	21,514	110	29,096
California	25	48,797	0	48,822
Colorado	836	2,407	0	3,243
Delaware	0	64	0	64
Florida	4,290	1,944	387	6,621
Georgia	4,620	4,248	0	8,868
Illinois	4,059	5,504	1,191	10,754
Indiana	1,778	1,075	55	2,908
Iowa	4,820	0	0	4,820
Kansas	2,299	6,296	0	8,595
Kentucky	6,000	0	0	6,000
Louisiana	4,852	0	0	4,852
Minnesota	1,000	575	0	1,575
Mississippi	9,095	5,813	829	15,737
Missouri	3,467	18,788	0	22,255
Nebraska	13,611	3,741	0	17,352
Nevada	500	0	0	500
New Mexico	9,016	6,673	0	15,689
North Carolina	873	60	0	933
Ohio	0	220	0	220
Oklahoma	24,888	8,931	0	33,819
Oregon	0	1,500	0	1,500
South Carolina	505	0	0	505
Tennessee	3,981	766	50	4,797
Texas	46,193	32,163	282	78,638
Utah	21	3,799	0	3,820
Virginia	0	662	0	662
Washington	500	500	0	1,000
Wisconsin	0	594	0	594
Wyoming	140	0	0	140
California Ports	0	8,161	0	8,161
Eastern Gulf Ports	0	0	485	485
Louisiana Gulf Ports	4,722	1,469	116,283	122,474
Pacific Northwest Ports	0	21,099	0	21,099
Texas Gulf Ports	37,643	44,705	0	82,348
Direct Exports	286	16,207	985	17,478
Total volume	203,276	297,969	123,330	624,575
Percent of total receipt	32.55	47.71	19.75	100.00

^a Does not include port area receipts.

Table 5.
1985 Interstate Shipments of Grain Sorghum for Each State by Mode of Transport (including ports).^a

Origin State	Mode			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	3,352	3,345	1,069	7,766
Arizona	311	3,942	0	4,253
Arkansas	24,614	772	18,231	43,617
California	500	0	0	500
Colorado	4,643	6,629	0	11,272
Florida	199	0	0	199
Georgia	3,671	500	0	4,171
Illinois	5,022	8,021	15,616	28,659
Indiana	0	1,145	451	1,596
Iowa	701	1,724	190	2,615
Kansas	27,929	104,656	1,022	133,607
Kentucky	4,252	1,025	4,781	10,058
Louisiana	7,844	0	9,576	17,420
Minnesota	0	594	660	1,254
Mississippi	3,645	2,169	8,979	14,793
Missouri	7,389	20,641	42,591	70,621
Nebraska	4,707	67,588	1,535	73,830
New Mexico	6,400	208	0	6,608
North Carolina	0	3,269	0	3,269
Ohio	0	0	51	51
Oklahoma	26,485	1,633	51	28,169
Oregon	500	0	0	500
South Carolina	1,000	263	0	1,263
South Dakota	8,891	795	0	9,686
Tennessee	5,900	5,156	17,483	28,539
Texas	55,321	62,556	985	118,862
Washington	0	1,338	0	1,338
Wisconsin	0	0	59	59
Total volume	203,276	297,969	123,330	624,575
Percent of total receipt	32.55	47.71	19.75	100.00

^a Shipment data include port destinations, but not shipments from ports to foreign destinations.

Table 6.
1985 Interstate Shipments of Grain Sorghum for Each State by Mode of Transport (excluding ports).^a

Origin State	Mode			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	3,352	3,345	50	6,747
Arizona	25	0	0	25
Arkansas	21,391	772	265	22,428
California	500	0	0	500
Colorado	4,643	6,629	0	11,272
Florida	199	0	0	199
Georgia	3,671	500	0	4,171
Illinois	5,022	7,146	283	12,451
Indiana	0	1,145	451	1,596
Iowa	701	1,724	91	2,516
Kansas	27,929	78,646	0	106,575
Kentucky	4,252	1,025	575	5,852
Louisiana	6,345	0	480	6,825
Minnesota	0	594	0	594
Mississippi	3,645	2,169	176	5,990
Missouri	7,389	20,166	885	28,440
Nebraska	4,707	45,639	140	50,486
New Mexico	6,400	38	0	6,438
North Carolina	0	3,269	0	3,269
Ohio	0	0	51	51
Oklahoma	26,485	1,633	0	28,118
Oregon	500	0	0	500
South Carolina	1,000	263	0	1,263
South Dakota	8,891	795	0	9,686
Tennessee	5,900	5,156	2,130	13,186
Texas	17,678	25,674	0	43,352
Total volume	160,625	206,328	5,577	372,530
Percent of total receipt	43.12	55.39	1.50	100.00

^a Shipment to U.S. ports are excluded from state totals.

Table 7.
Export Regions, Port Areas, and the Ports Included in Each Area.

Export Region	Export Area	Port City
Great Lakes Region	Duluth-Superior	Duluth, MN Superior, WI
	Chicago	Milwaukee, WI Manitowoc, WI Racine, WI Chicago, IL
	Toledo	Toledo, OH Huron, OH Erie, PA Buffalo, NY
	Saginaw	Carrollton, MI Saginaw, MI Zilwaukee, MI Detroit, MI
Atlantic Region	North Atlantic	Portland, ME Albany, NY Philadelphia, PA
Gulf Region	East Gulf	Pascagoula, MS Mobile, AL
	Louisiana Gulf	Mississippi River Lake Charles, LA
	North Texas Gulf	Beaumont, TX Port Arthur, TX Houston, TX Galveston, TX
	South Texas Gulf	Brownsville, TX Corpus Christi, TX
Pacific Region	Columbia River	Kalama, WA Longview, WA Vancouver, WA Portland, OR Astoria, OR
	Puget Sound	Seattle, WA Tacoma, WA
	California Ports	Sacramento, CA Stockton, CA Long Beach, CA San Francisco, CA San Diego, CA

Comparisons with 1977

Production and Utilization

Changes in supplies and distribution during the period from 1977 to 1985 indicate long-term trends as well as changes in economic variables. With only two points in time identified, it is difficult to discern a true trend in the data over this time period, but one can identify shifts and hypothesize some of the economic factors that caused them.

Production in the marketing year beginning September 1, 1985, and ending August 31, 1986, showed a marked increase over the 1977/78 marketing year. However, an examination of the annual production data suggests that 1985/86 was abnormally high and does

not represent a true trend (Table 1). In fact, production in 1987/88 was slightly below that of 1977/78. The large supply at harvest in 1985 must be kept in mind when reviewing changes in grain movements between calendar years 1977 and 1985.

Because exports in 1977/78 were at a low for the period (Table 1), a comparison with exports of recent time periods appears to show major increases. However, the long-term trend from 1975/76 through 1987/88 is fairly flat for exports. The same is true of total utilization (disappearance). The peak in export volume in 1984/85 was another important phenomenon in the comparison of 1985 calendar year receipts and shipments with those of 1977 in this section of the report.

Table 8.
1985 Receipts of Grain Sorghum at Port Areas by Each Mode of Transport.

Export region and port area	Mode of Transport			Total	Port share percent
	Truck	Rail	Barge		
<i>thousands of bushels</i>					
Great Lakes Region	0	0	0	0	0.00
Atlantic Region	0	0	0	0	0.00
Gulf Region					
Eastern Gulf	0	0	485	485	0.19
Louisiana Gulf	4,722	1,469	116,283	122,474	48.59
Texas Gulf	37,643	44,705	0	82,348	32.67
Subtotal	42,365	46,174	116,768	205,307	81.46
Pacific Region					
Pacific Northwest	0	21,099	0	21,099	8.37
California Ports	0	8,161	0	8,161	3.24
Subtotal	0	29,260	0	29,260	11.61
Interior Region Exports	286	16,207	985	17,478	6.93
Total receipts	42,651	91,641	117,753	252,045	100.00
Percentage of total receipts	16.92	36.36	46.72	100.00	

Table 9.
1985 Shipments of Grain Sorghum to Points of Export for Each Originating State by
Mode of Transport.^a

Originating State	Export Region	Mode of Transport			Total
		Truck	Rail	Barge	
thousands of bushels					
Alabama	Eastern Gulf	0	0	485	485
Alabama	Louisiana Gulf	0	0	534	534
Arizona	Direct Exports	286	3,942	0	4,228
Arkansas	Louisiana Gulf	3,223	0	17,966	21,189
Illinois	Louisiana Gulf	0	875	15,333	16,208
Iowa	Louisiana Gulf	0	0	99	99
Kansas	Louisiana Gulf	0	594	1,022	1,616
Kansas	Texas Gulf	0	15,238	0	15,238
Kansas	Pacific Northwest	0	824	0	824
Kansas	California Ports	0	2,104	0	2,104
Kansas	Direct Exports	0	7,250	0	7,250
Kentucky	Louisiana Gulf	0	0	4,206	4,206
Louisiana	Louisiana Gulf	1,499	0	9,096	10,595
Minnesota	Louisiana Gulf	0	0	660	660
Mississippi	Louisiana Gulf	0	0	8,803	8,803
Missouri	Louisiana Gulf	0	0	41,706	41,706
Missouri	California Ports	0	475	0	475
Nebraska	Louisiana Gulf	0	0	1,395	1,395
Nebraska	Pacific Northwest	0	18,937	0	18,937
Nebraska	California Ports	0	3,012	0	3,012
New Mexico	California Ports	0	170	0	170
Oklahoma	Louisiana Gulf	0	0	51	51
Tennessee	Louisiana Gulf	0	0	15,353	15,353
Texas	Texas Gulf	37,643	29,467	0	67,110
Texas	California Ports	0	2,400	0	2,400
Texas	Direct Exports	0	5,015	985	6,000
Washington	Pacific Northwest	0	1,338	0	1,338
Wisconsin	Louisiana Gulf	0	0	59	59
Total volume		42,651	91,641	117,753	252,045
Percentage of total volume		16.92	36.36	46.72	100.00

^a For definition of export region, see Table 7.

Table 10.
1985 Total Shipments of Grain Sorghum to Points of Export by State of Origin and Mode of Transport.

Originating State	Mode of Transport			Total Volume at Ports	Percent of Receipts at Port Areas
	Truck	Rail	Barge		
thousands of bushels					
Alabama	0	0	1,019	1,019	0.40
Arizona	286	3,942	0	4,228	1.68
Arkansas	3,223	0	17,966	21,189	8.41
Illinois	0	875	15,333	16,208	6.43
Iowa	0	0	99	99	0.04
Kansas	0	26,010	1,022	27,032	10.73
Kentucky	0	0	4,206	4,206	1.67
Louisiana	1,499	0	9,096	10,595	4.20
Minnesota	0	0	660	660	0.26
Mississippi	0	0	8,803	8,803	3.49
Missouri	0	475	41,706	42,181	16.74
Nebraska	0	21,949	1,395	23,344	9.26
New Mexico	0	170	0	170	0.07
Oklahoma	0	0	51	51	0.02
Tennessee	0	0	15,353	15,353	6.09
Texas	37,643	36,882	985	75,510	29.96
Washington	0	1,338	0	1,338	0.53
Wisconsin	0	0	59	59	0.02
Total volume	42,651	91,641	117,753	252,045	100.00

Figure 3.
1985 State Shares of Grain Sorghum Shipments to Port Areas.

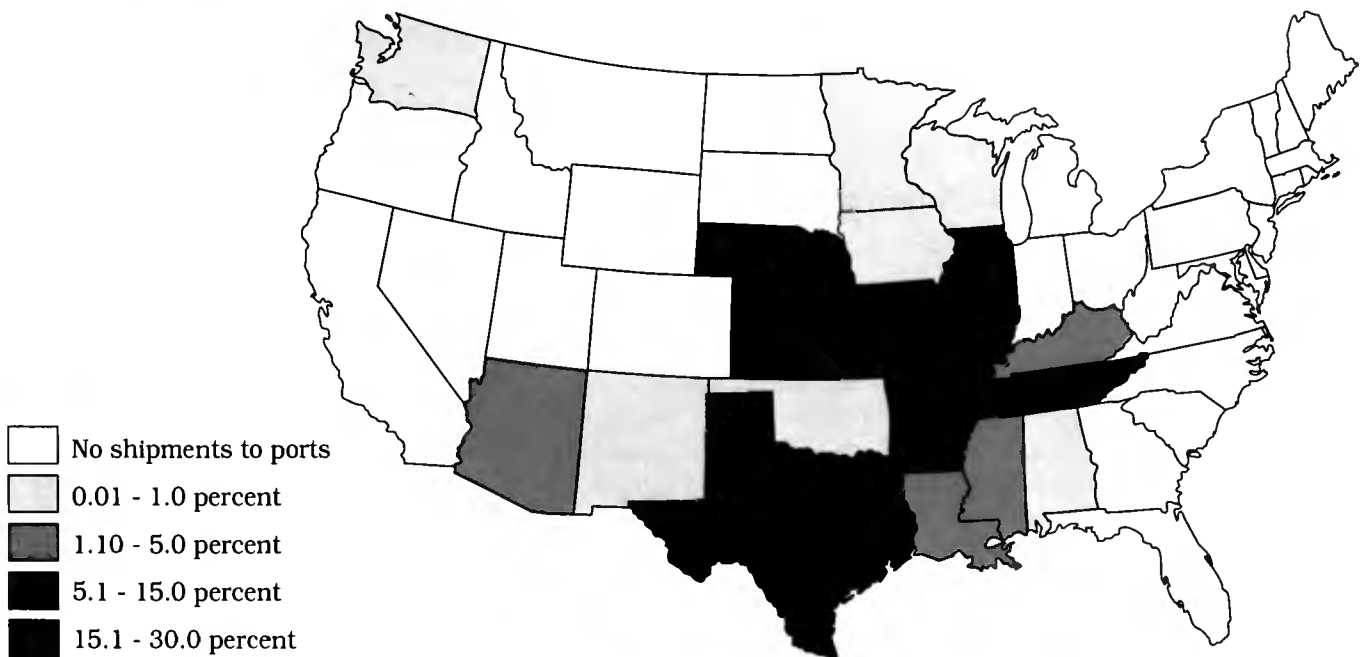


Table 11.
1985 Exports of U.S. Grain Sorghum by Export Region and Destination.

Destination	Export region			Total
	Gulf	Pacific	Interior	
<i>thousands of bushels</i>				
Benin	1,089			1,089
Botswana	747		118	865
Burkina	753			753
Chad	1,022			1,022
China - T	3,637	1,653		5,290
Colombia	3,774			3,774
Cyprus	1,340			1,340
Ecuador	827			827
Egypt	12			12
Ethiopia	89			89
Israel	18,865			18,865
Japan	72,098	24,760		96,858
Mauritania	448			448
Mexico	32,619	2,480	18,249	53,348
Netherlands	12			12
Niger	2,877			2,877
Nigeria	394			394
Other W. Africa	133			133
Portugal	1,245			1,245
Senegal	553			553
Sudan	21,805			21,805
Togo	18			18
Trinidad	137			137
Venezuela	36,587			36,587
Total	201,081	28,893	18,367	248,341

Source: *Grain and Feed Market News*, Agricultural Marketing Service, U.S.D.A., Vol. 34, No. 5 (January 31, 1986), pp. 15-19.

Interstate Shipments

Total interstate shipments of sorghum in calendar year 1985 increased by 137.88 percent over 1977 interstate shipments (Table 12). Increases occurred in all three transport modes, although rail's share of the total dropped from 82.77 percent in 1977 to 37.11 percent in 1985. Barge and truck shipments accounted for the largest increase in volume; rail shipments increased, but less dramatically. The major interstate shippers in 1977 were Kansas and Nebraska, accounting for 69 percent of the total shipments. In 1985, Kansas and Nebraska were still major ship-

pers but with only 33.2 percent of the total. Texas moved into second place in 1985 with 19 percent of the shipments. The states located adjacent to the Mississippi River generally increased their shares as compared to 1977. While Kansas, Texas and Nebraska continued to be the three primary producing states, the overall shipment pattern involved significant volumes in a greater number of states in 1985 than in 1977.

Major increases in production in southeastern states resulted in large increases in surpluses and shipments in those states (Table 13).

Exports by Port

The quantities of receipts reported at the ports do not match exactly the quantities reported as inspections for export because of inventory changes and small volume exports that are not always inspected. U.S. exports through Canadian ports also resulted in differences between reported receipts and reported exports (Table 14). Almost all of the sorghum received at ports in 1977 moved to the Gulf and Pacific ports, with the Gulf ports having by far the largest share.

There was no significant change in this pattern in 1985. The Gulf region retained more than 80 percent of the total receipts at ports, although there were major shifts within the Gulf region. The volume in Louisiana Gulf ports increased dramatically from 11.1 million bushels received in 1977 to 122.5 million bushels in 1985. Receipts at Texas Gulf ports, on the other hand, declined from 227.7 million bushels in 1977 to only 82.3 million bushels in 1985 (Table 14). The change came primarily as a result of increased barge movements from Missouri to the Louisiana Gulf (Table 9).

The growth in shipments out of Missouri from 4 million bushels in 1977 to 42.2 million bushels in 1985 had a major impact on port shares (Table 10). Most of the states bordering the Mississippi River showed major increases in barge movements to the Gulf ports (Figure 4).

Mode of Transport

Shifts in interstate movements among rail, truck, and barge transportation modes were in response to changes in rates and supply of transport equipment as well as changes in relative prices in the different geographic areas. With exports of all grains generally on a decline in 1985, supply of all modes of transport were in surplus. Therefore, those shifts that occurred must have been in response to transportation rates or the pull from particular market areas that had advantages in one or another mode (such as barges to the Gulf).

Interstate shipments between 1977 and 1985 showed a shift from rail to barge and truck (Table 13). The volume of rail shipments increased slightly from 217.3 million bushels in 1977 to 298 million in 1985. However, barge shipments increased from 8.7

Table 12.

Total Volume of Interstate Shipments by Mode of Transport, 1977 vs. 1985.^a

Mode	1977 ^b		1985		Percent change
	Volume	Percent share	Volume	Percent share	
	(.000 bu.)		(.000 bu.)		
Truck	36,540	13.92	203,276	32.55	456.31
Rail	217,318	82.77	297,969	47.71	37.11
Barge	8,702	3.31	123,330	19.75	1317.26
Total	262,560	100.00	624,575	100.00	137.88

^a Shipments to Port Areas are included.

^b Derived from *Sorghum Movements in the United States, Interregional Flow Patterns and Transportation Requirements in 1977*, by Mack N. Leath, Lowell D. Hill, and Stephen W. Fuller, p. 9.

Table 13.
Interstate Shipments of Grain Sorghum for Each State and Mode of Transportation, 1977 and 1985.^a

Origin State	Truck		Rail		Barge	
	1977	1985	1977	1985	1977	1985
<i>thousands of bushels</i>						
Alabama	0	3,352	0	3,345	0	1,069
Arizona	71	311	94	3,942	0	0
Arkansas	2,429	24,614	5,838	772	2,010	18,231
California	0	500	0	0	0	0
Colorado	927	4,643	5,761	6,629	0	0
Florida	0	199	0	0	246	0
Georgia	0	3,671	0	500	0	0
Illinois	284	5,022	1,938	8,021	1,089	15,616
Indiana	0	0	0	1,145	0	451
Iowa	258	701	2,054	1,724	0	190
Kansas	16,619	27,929	79,912	104,656	552	1,022
Kentucky	32	4,252	0	1,025	0	4,781
Louisiana	51	7,844	12	0	0	9,576
Minnesota	0	0	0	594	0	660
Mississippi	0	3,645	0	2,169	0	8,979
Missouri	3,080	7,389	20,580	20,641	3,990	42,591
Nebraska	5,770	4,707	78,994	67,588	0	1,535
New Mexico	3,724	6,400	484	208	0	0
North Carolina	0	0	0	3,269	0	0
Ohio	0	0	0	0	0	51
Oklahoma	1,535	26,485	4,263	1,633	0	51
Oregon	0	500	0	0	0	0
South Carolina	0	1,000	0	263	0	0
South Dakota	28	8,891	98	795	0	0
Tennessee	32	5,900	0	5,156	815	17,483
Texas	1,700	55,321	17,290	62,556	0	985
Washington	0	0	0	1,338	0	0
Wisconsin	0	0	0	0	0	59
Total volume	36,540	203,276	217,318	297,969	8,702	123,330
Percent of total volume	13.92	32.55	82.77	47.71	3.31	19.75

^a Includes shipments to port areas.

million bushels to 123.3 million in response to increased exports from the Gulf. All the major producing states and those bordering the Mississippi River utilized barges either as an alternative to rail or in conjunction with rail to ship the excess supplies.

The most dramatic shift in transportation mode was in movement of sorghum to export points. Barge transportation as a percent of total volume to all ports increased from 3.31 percent in 1977 to 19.75 percent in 1985 (Table 12). The share of transportation by rail decreased as a result of the major shipments to the Gulf by water from Missouri, Arkansas, Tennessee, Louisiana, Mississippi,

and Illinois (Table 10). Those states with major increases in shipments to ports also had major increases in production between 1977 and 1985. For example, Illinois' 1977 production of 4.1 million bushels increased to 36.2 million in 1985 (Table 2). Louisiana, with only 660 thousand bushels in 1977, produced 27.9 million in 1985. Missouri, with 67.9 million bushels in 1977, produced 117 million in 1985. These rapid production increases in states with access to water transportation shifted the balance of feed use versus exports and placed these states in a position of becoming major exporting regions. This is best illustrated in Figure 4 showing

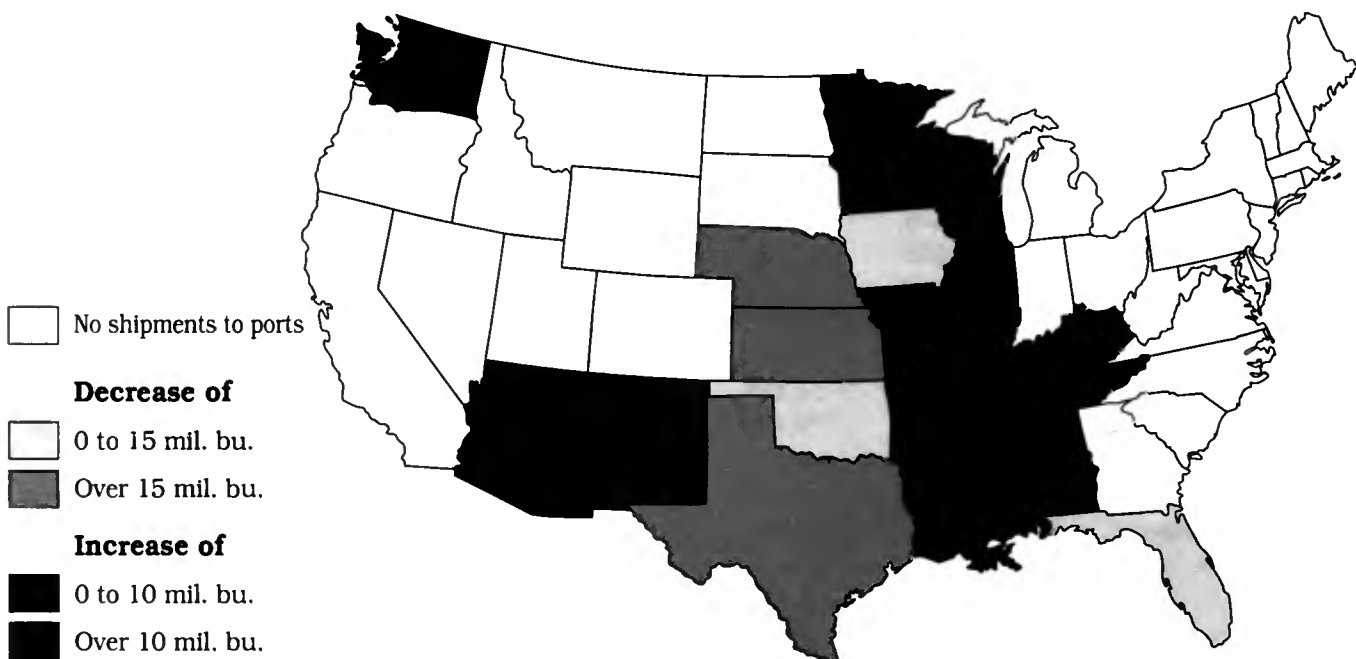
Table 14.
Inspections for Export and Total Receipts of Grain Sorghum at Port Areas, 1977 and 1985.

Export Region and Port Area	1977	1985	1977		1985	
	Inspections for Export ^a		Total Receipts		Total Receipts	
	(,000 bu.)	(,000 bu.)	(,000 bu.)	Percent	(,000 bu.)	Percent
Great Lakes Region	0	0	0	0.00	0	0.00
Atlantic Region	0	0	0	0.00	0	0.00
Gulf Region						
Eastern Gulf	0	609	0	0.00	485	0.19
Louisiana Gulf	5,526	122,767	11,126	4.57	122,474	48.59
Texas Gulf	218,235	77,705	227,725	93.63	82,348	32.67
Subtotal	223,761	201,081	238,851	98.20	205,307	81.46
Pacific Region						
Pacific Northwest	1,378	21,426	2,211	0.91	21,099	8.37
California Ports	1,869	7,467	2,165	0.89	8,161	3.24
Subtotal	3,247	28,893	4,376	1.80	29,260	11.61
Interior Reg. Exports	0	18,367	0	0.00	17,478	6.93
Total	227,008	248,341	243,227	100.00	252,045	100.00

^a **Source:** *Grain and Feed Market News*, Agricultural Marketing Service, U.S.D.A., Washington, D.C., various issues.

the change in percent of exports originating in each state between 1977 and 1985. The decline in shares of port shipments from Nebraska, Kansas, and Texas is the result of major increases in production in Missouri and Illinois. In general, those states experiencing an increase in production also increased their percent of total volume shipped to ports (Figure 4).

Figure 4.
Change in Volume of Grain Sorghum Shipments to Points of Export from Each
Originating State, 1977 vs. 1985.



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Appendix

Receipts and Shipments of Grain Sorghum by State, 1985.

Table 15. Alabama

Sorghum Receipts from Various Origins

	Mode of transportation			
Origin	Truck	Rail	Barge	Total
	<i>thousands of bushels</i>			
Arkansas	0	0	51	51
Florida	199	0	0	199
Georgia	2,243	0	0	2,243
Illinois	0	2,715	57	2,772
Indiana	0	705	396	1,101
Kentucky	157	467	575	1,199
Louisiana	0	0	61	61
Mississippi	1,000	1,189	0	2,189
Missouri	0	0	55	55
North Carolina	0	891	0	891
Ohio	0	0	51	51
Tennessee	1,392	705	1,427	3,524
Total interstate	4,991	6,672	2,673	14,336

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Florida	2,240	227	0	2,467
Georgia	1,112	1,929	0	3,041
Mississippi	0	1,189	0	1,189
Tennessee	0	0	50	50
Eastern Gulf	0	0	485	485
Louisiana Gulf	0	0	534	534
Total interstate	3,352	3,345	1,069	7,766
Intrastate	6,022	1,093	533	7,648
Total	9,374	4,438	1,602	15,414

Table 16. Arizona

Sorghum Receipts from Various Origins

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Colorado	0	250	0	250
Kansas	159	17,624	0	17,783
Nebraska	0	260	0	260
New Mexico	500	0	0	500
Oklahoma	0	743	0	743
Texas	134	4,145	0	4,279
Total interstate	793	23,022	0	23,815

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
California	25	0	0	25
Direct Exports	286	3,942	0	4,228
Total interstate	311	3,942	0	4,253
Intrastate	1,725	2,190	0	3,915
Total	2,036	6,132	0	8,168

Table 17. Arkansas

Sorghum Receipts from Various Origins

	Mode of transportation			
Origin	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Illinois	143	662	57	862
Iowa	701	0	0	701
Kansas	1,686	2,098	0	3,784
Louisiana	0	0	53	53
Mississippi	0	572	0	572
Missouri	2,032	9,084	0	11,116
Nebraska	230	1,605	0	1,835
Oklahoma	1,033	0	0	1,033
South Dakota	0	220	0	220
Tennessee	0	548	0	548
Texas	1,647	6,725	0	8,372
Total interstate	7,472	21,514	110	29,096

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
	<i>thousands of bushels</i>			
Alabama	0	0	51	51
Illinois	0	0	112	112
Kentucky	2,000	0	0	2,000
Louisiana	3,852	0	0	3,852
Mississippi	3,899	0	46	3,945
Missouri	440	247	0	687
Oklahoma	6,000	0	0	6,000
Tennessee	2,200	0	0	2,200
Texas	3,000	525	56	3,581
Louisiana Gulf	3,223	0	17,966	21,189
Total interstate	24,614	772	18,231	43,617
Intrastate	47,329	0	212	47,541
Total	71,943	772	18,443	91,158

Table 18. California

Sorghum Receipts from Various Origins

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Arizona	25	0	0	25
Colorado	0	1,136	0	1,136
Kansas	0	22,382	0	22,382
Nebraska	0	12,955	0	12,955
Texas	0	12,324	0	12,324
Total interstate	25	48,797	0	48,822

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Nevada	500	0	0	500
Total interstate	500	0	0	500
Intrastate	914	0	0	914
Total	1,414	0	0	1,414

Table 19. Colorado

Sorghum Receipts from Various Origins

	Mode of transportation			
Origin	Truck	Rail	Barge	Total
	<i>thousands of bushels</i>			
Kansas	356	643	0	999
Nebraska	480	1,764	0	2,244
Total interstate	836	2,407	0	3,243

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
	<i>thousands of bushels</i>			
Arizona	0	250	0	250
California	0	1,136	0	1,136
New Mexico	4	0	0	4
Texas	4,499	1,975	0	6,474
Utah	0	3,268	0	3,268
Wisconsin	140	0	0	140
Total interstate	4,643	6,629	0	11,272
Intrastate	383	248	0	631
Total	5,026	6,877	0	11,903

Table 20. Delaware

Sorghum Receipts from Various Origins

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
	<i>thousands of bushels</i>			
Tennessee	0	64	0	64
Total interstate	0	64	0	64
Intrastate	0	0	0	0
Total	0	64	0	64

Table 21. Florida**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	2,240	227	0	2,467
Georgia	50	440	0	490
Kentucky	0	356	0	356
Louisiana	0	0	211	211
Mississippi	2,000	232	176	2,408
North Carolina	0	220	0	220
South Carolina	0	263	0	263
Tennessee	0	206	0	206
Total interstate	4,290	1,944	387	6,621

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	199	0	0	199
Total interstate	199	0	0	199
Intrastate	0	0	0	0
Total	199	0	0	199

Table 22. Georgia**Sorghum Receipts from Various Origins**

	Mode of transportation			
Origin	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Alabama	1,112	1,929	0	3,041
Illinois	0	854	0	854
Kentucky	0	202	0	202
North Carolina	0	835	0	835
South Carolina	1,000	0	0	1,000
Tennessee	2,508	428	0	2,936
Total interstate	4,620	4,248	0	8,868

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Alabama	2,243	0	0	2,243
Florida	50	440	0	490
North Carolina	873	60	0	933
South Carolina	505	0	0	505
Total interstate	3,671	500	0	4,171
Intrastate	564	673	0	1,237
Total	4,235	1,173	0	5,408

Table 23. Illinois**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Arkansas	0	0	112	112
Indiana	0	220	55	275
Kentucky	2,781	0	0	2,781
Louisiana	0	0	105	105
Missouri	1,278	378	216	1,872
Nebraska	0	4,906	0	4,906
Tennessee	0	0	703	703
Total interstate	4,059	5,504	1,191	10,754

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Alabama	0	2,715	57	2,772
Arkansas	143	662	57	862
Georgia	0	854	0	854
Indiana	1,600	1,075	55	2,730
Kentucky	2,000	0	0	2,000
Mississippi	0	1,003	0	1,003
Missouri	1,279	0	0	1,279
Tennessee	0	590	0	590
Texas	0	247	114	361
Louisiana Gulf	0	875	15,333	16,208
Total interstate	5,022	8,021	15,616	28,659
Intrastate	7,584	5,295	1,726	14,605
Total	12,606	13,316	17,342	43,264

Table 24. Indiana**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Illinois	1,600	1,075	55	2,730
Kentucky	178	0	0	178
Total interstate	1,778	1,075	55	2,908

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	0	705	396	1,101
Illinois	0	220	55	275
Ohio	0	220	0	220
Total interstate	0	1,145	451	1,596
Intrastate	4	286	0	290
Total	4	1,431	451	1,886

Table 25. Iowa**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Missouri	3,966	0	0	3,966
Nebraska	56	0	0	56
South Dakota	798	0	0	798
Total interstate	4,820	0	0	4,820

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Arkansas	701	0	0	701
Mississippi	0	0	91	91
Texas	0	1,724	0	1,724
Louisiana Gulf	0	0	99	99
Total interstate	701	1,724	190	2,615
Intrastate	0	0	0	0
Total	701	1,724	190	2,615

Table 26. Kansas**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Missouri	113	547	0	660
Nebraska	2,186	5,085	0	7,271
Texas	0	664	0	664
Total interstate	2,299	6,296	0	8,595

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Arizona	159	17,624	0	17,783
Arkansas	1,686	2,098	0	3,784
California	0	22,382	0	22,382
Colorado	356	643	0	999
Missouri	514	13,424	0	13,938
Nebraska	6,518	3,741	0	10,259
New Mexico	0	6,079	0	6,079
Oklahoma	12,388	5,984	0	18,372
Texas	6,308	6,171	0	12,479
Washington	0	500	0	500
Louisiana Gulf	0	594	1,022	1,616
Texas Gulf	0	15,238	0	15,238
Pacific N.W.	0	824	0	824
California Ports	0	2,104	0	2,104
Direct Exports	0	7,250	0	7,250
Total interstate	27,929	104,656	1,022	133,607
Intrastate	46,122	67,113	0	113,235
Total	74,051	171,769	1,022	246,842

Table 27. Kentucky**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Arkansas	2,000	0	0	2,000
Illinois	2,000	0	0	2,000
Tennessee	2,000	0	0	2,000
Total interstate	6,000	0	0	6,000

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Alabama	157	467	575	1,199
Florida	0	356	0	356
Georgia	0	202	0	202
Illinois	2,781	0	0	2,781
Indiana	178	0	0	178
Tennessee	1,136	0	0	1,136
Louisiana Gulf	0	0	4,206	4,206
Total interstate	4,252	1,025	4,781	10,058
Intrastate	362	0	0	362
Total	4,614	1,025	4,781	10,420

Table 28. Louisiana**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Arkansas	3,852	0	0	3,852
Texas	1,000	0	0	1,000
Total interstate	4,852	0	0	4,852

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
	<i>thousands of bushels</i>			
Alabama	0	0	61	61
Arkansas	0	0	53	53
Florida	0	0	211	211
Illinois	0	0	105	105
Mississippi	5,196	0	50	5,246
Texas	1,149	0	0	1,149
Louisiana Gulf	1,499	0	9,096	10,595
Total interstate	7,844	0	9,576	17,420
Intrastate	2,165	1,272	118	3,555
Total	10,009	1,272	9,694	20,975

Table 29. Minnesota

Sorghum Receipts from Various Origins

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
	<i>thousands of bushels</i>			
South Dakota	1,000	575	0	1,575
Total interstate	1,000	575	0	1,575

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Wisconsin	0	594	0	594
Louisiana Gulf	0	0	660	660
Total interstate	0	594	660	1,254
intrastate	0	0	0	0
Total	0	594	660	1,254

Table 30. Mississippi

Sorghum Receipts from Various Origins

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	0	1,189	0	1,189
Arkansas	3,899	0	46	3,945
Illinois	0	1,003	0	1,003
Iowa	0	0	91	91
Louisiana	5,196	0	50	5,246
Missouri	0	0	502	502
Nebraska	0	0	140	140
North Carolina	0	661	0	661
Tennessee	0	2,960	0	2,960
Total interstate	9,095	5,813	829	15,737

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Alabama	1,000	1,189	0	2,189
Arkansas	0	572	0	572
Florida	2,000	232	176	2,408
Tennessee	645	176	0	821
Louisiana Gulf	0	0	8,803	8,803
Total interstate	3,645	2,169	8,979	14,793
Intrastate	11,647	990	52	12,689
Total	15,292	3,159	9,031	27,482

Table 31. Missouri**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Arkansas	440	247	0	687
Illinois	1,279	0	0	1,279
Kansas	514	13,424	0	13,938
Nebraska	1,234	3,895	0	5,129
Texas	0	1,222	0	1,222
Total interstate	3,467	18,788	0	22,255

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Alabama	0	0	55	55
Arkansas	2,032	9,084	0	11,116
Illinois	1,278	378	216	1,872
Iowa	3,966	0	0	3,966
Kansas	113	547	0	660
Mississippi	0	0	502	502
Oklahoma	0	735	0	735
Texas	0	9,422	112	9,534
Louisiana Gulf	0	0	41,706	41,706
California Ports	0	475	0	475
Total interstate	7,389	20,641	42,591	70,621
Intrastate	2,248	6,450	0	8,698
Total	9,637	27,091	42,591	79,319

Table 32. Nebraska**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Kansas	6,518	3,741	0	10,259
South Dakota	7,093	0	0	7,093
Total interstate	13,611	3,741	0	17,352

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Arizona	0	260	0	260
Arkansas	230	1,605	0	1,835
California	0	12,955	0	12,955
Colorado	480	1,764	0	2,244
Illinois	0	4,906	0	4,906
Iowa	56	0	0	56
Kansas	2,186	5,085	0	7,271
Mississippi	0	0	140	140
Missouri	1,234	3,895	0	5,129
Oklahoma	500	2,212	0	2,712
Oregon	0	1,500	0	1,500
Texas	0	10,926	0	10,926
Utah	21	531	0	552
Louisiana Gulf	0	0	1,395	1,395
Pacific N.W.	0	18,937	0	18,937
California Ports	0	3,012	0	3,012
Total interstate	4,707	67,588	1,535	73,830
Intrastate	62,843	13,473	0	76,316
Total	67,550	81,061	1,535	150,146

Table 33. Nevada**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
California	500	0	0	500
Total interstate	500	0	0	500

Table 34. New Mexico**Sorghum Receipts from Various Origins**

	Mode of transportation			
Origin	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Colorado	4	0	0	4
Kansas	0	6,079	0	6,079
Oklahoma	115	0	0	115
Texas	8,897	594	0	9,491
Total interstate	9,016	6,673	0	15,689

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Arizona	500	0	0	500
Texas	5,900	38	0	5,938
California Ports	0	170	0	170
Total interstate	6,400	208	0	6,608
Intrastate	925	0	0	925
Total	7,325	208	0	7,533

Table 35. North Carolina**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Georgia	873	60	0	933
Total Interstate	873	60	0	933

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	0	891	0	891
Florida	0	220	0	220
Georgia	0	835	0	835
Mississippi	0	661	0	661
Virginia	0	662	0	662
Total interstate	0	3,269	0	3,269
Intrastate	39	452	0	491
Total	39	3,721	0	3,760

Table 36. Ohio**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
	<i>thousands of bushels</i>			
Indiana	0	220	0	220
Total interstate	0	220	0	220

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	0	0	51	51
Total interstate	0	0	51	51
Intrastate	0	0	0	0
Total	0	0	51	51

Table 37. Oklahoma**Sorghum Receipts from Various Origins**

	Mode of transportation			
Origin	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Arkansas	6,000	0	0	6,000
Kansas	12,388	5,984	0	18,372
Missouri	0	735	0	735
Nebraska	500	2,212	0	2,712
Texas	6,000	0	0	6,000
Total interstate	24,888	8,931	0	33,819

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Arizona	0	743	0	743
Arkansas	1,033	0	0	1,033
New Mexico	115	0	0	115
Texas	25,337	890	0	26,227
Louisiana Gulf	0	0	51	51
Total interstate	26,485	1,633	51	28,169
Intrastate	0	245	0	245
Total	26,485	1,878	51	28,414

Table 38. Oregon**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
	<i>thousands of bushels</i>			
Nebraska	0	1,500	0	1,500
Total Interstate	0	1,500	0	1,500

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
	<i>thousands of bushels</i>			
Washington	500	0	0	500
Total Interstate	500	0	0	500
Intrastate	0	0	0	0
Total	500	0	0	500

Table 39. South Carolina**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
	<i>thousands of bushels</i>			
Georgia	505	0	0	505
Total Interstate	505	0	0	505

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
	<i>thousands of bushels</i>			
Florida	0	263	0	263
Georgia	1,000	0	0	1,000
Total Interstate	1,000	263	0	1,263
Intrastate	0	0	0	0
Total	1,000	263	0	1,263

Table 40. Tennessee

Sorghum Receipts from Various Origins

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	0	0	50	50
Arkansas	2,200	0	0	2,200
Illinois	0	590	0	590
Kentucky	1,136	0	0	1,136
Mississippi	645	176	0	821
Total interstate	3,981	766	50	4,797

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Alabama	1,392	705	1,427	3,524
Arkansas	0	548	0	548
Delaware	0	64	0	64
Florida	0	206	0	206
Georgia	2,508	428	0	2,936
Illinois	0	0	703	703
Kentucky	2,000	0	0	2,000
Mississippi	0	2,960	0	2,960
Texas	0	245	0	245
Louisiana Gulf	0	0	15,353	15,353
Total interstate	5,900	5,156	17,483	28,539
Intrastate	3,506	790	0	4,296
Total	9,406	5,946	17,483	32,835

Table 41. Texas

Sorghum Receipts from Various Origins

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Arkansas	3,000	525	56	3,581
Colorado	4,499	1,975	0	6,474
Illinois	0	247	114	361
Iowa	0	1,724	0	1,724
Kansas	6,308	6,171	0	12,479
Louisiana	1,149	0	0	1,149
Missouri	0	9,422	112	9,534
Nebraska	0	10,926	0	10,926
New Mexico	5,900	38	0	5,938
Oklahoma	25,337	890	0	26,227
Tennessee	0	245	0	245
Total interstate	46,193	32,163	282	78,638

Sorghum Shipments to Various Destinations

	Mode of transportation			
Destination	Truck	Rail	Barge	Total
<i>thousands of bushels</i>				
Arizona	134	4,145	0	4,279
Arkansas	1,647	6,725	0	8,372
California	0	12,324	0	12,324
Kansas	0	664	0	664
Louisiana	1,000	0	0	1,000
Missouri	0	1,222	0	1,222
New Mexico	8,897	594	0	9,491
Oklahoma	6,000	0	0	6,000
Texas Gulf	37,643	29,467	0	67,110
California Ports	0	2,400	0	2,400
Direct Exports	0	5,015	985	6,000
Total interstate	55,321	62,556	985	118,862
Intrastate	286,602	55,604	271	342,477
Total	341,923	118,160	1,256	461,339

Table 42. Utah**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
	<i>thousands of bushels</i>			
Colorado	0	3,268	0	3,268
Nebraska	21	531	0	552
Total Interstate	21	3,799	0	3,820

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Intrastate	36	0	0	36
Total	36	0	0	36

Table 43. Virginia**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
North Carolina	0	662	0	662
Total Interstate	0	662	0	662

Table 44. Washington**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
	<i>thousands of bushels</i>			
Kansas	0	500	0	500
Oregon	500	0	0	500
Total Interstate	500	500	0	1,000

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Pacific N.W.	0	1,338	0	1,338
Total interstate	0	1,338	0	1,338
Intrastate	0	248	0	248
Total	0	1,586	0	1,586

Table 45. Wisconsin**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Minnesota	0	594	0	594
Total interstate	0	594	0	594

Sorghum Shipments to Various Destinations

Destination	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Louisiana Gulf	0	0	59	59
Total interstate	0	0	59	59
Intrastate	0	0	0	0
Total	0	0	59	59

Table 46. Wyoming**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Colorado	140	0	0	140
Total interstate	140	0	0	140

Table 47. California Ports**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Kansas	0	2,104	0	2,104
Missouri	0	475	0	475
Nebraska	0	3,012	0	3,012
New Mexico	0	170	0	170
Texas	0	2,400	0	2,400
Total interstate	0	8,161	0	8,161

Table 48. Eastern Gulf**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	0	0	485	485
Total interstate	0	0	485	485

Table 49. Louisiana Gulf**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Alabama	0	0	534	534
Arkansas	3,223	0	17,966	21,189
Illinois	0	875	15,333	16,208
Iowa	0	0	99	99
Kansas	0	594	1,022	1,616
Kentucky	0	0	4,206	4,206
Louisiana	1,499	0	9,096	10,595
Minnesota	0	0	660	660
Mississippi	0	0	8,803	8,803
Missouri	0	0	41,706	41,706
Nebraska	0	0	1,395	1,395
Oklahoma	0	0	51	51
Tennessee	0	0	15,353	15,353
Wisconsin	0	0	59	59
Total interstate	4,722	1,469	116,283	122,474

Table 50. Pacific Northwest**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Kansas	0	824	0	824
Nebraska	0	18,937	0	18,937
Washington	0	1,338	0	1,338
Total interstate	0	21,099	0	21,099

Table 51. Texas Gulf**Sorghum Receipts from Various Origins**

Origin	Mode of transportation			Total
	Truck	Rail	Barge	
<i>thousands of bushels</i>				
Kansas	0	15,238	0	15,238
Texas	37,643	29,467	0	67,110
Total interstate	37,643	44,705	0	82,348

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